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|                             | OFFICE OF DRINKING WATER<br>AND MUNICIPAL ASSISTANCE<br>POLICY AND PROCEDURE |                 | DEPARTMENT OF<br>ENVIRONMENTAL QUALITY  |
| Original Effective Date:<br>March 9, 2004<br><br>Revised Date:<br><br><br>Reformatted Date:<br>April 3, 2013 | Subject:<br>Water Well Completion Using Angle Drilling                       |                 | Category:<br><br><input type="checkbox"/> Internal/Administrative<br><br><input type="checkbox"/> External/Noninterpretive<br><br><input checked="" type="checkbox"/> External/Interpretive |
|  | Division/Office and Program Names:<br>ODWMA- Well Construction Program       |                 |   |
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*A Department of Environmental Quality (DEQ) Policy and Procedure cannot establish regulatory requirements for parties outside of the DEQ. This document provides direction to DEQ staff regarding the implementation of rules and laws administered by the DEQ. It is merely explanatory; does not affect the rights of, or procedures and practices available to, the public; and does not have the force and effect of law.*

## **INTRODUCTION, PURPOSE, OR ISSUE:**

In certain areas in Michigan, a sufficient supply of water cannot be obtained by installing conventional vertical water well due to geological conditions. Angle drilling is a nonconventional means of constructing water wells in certain groundwater challenged areas, and is being used on a very limited basis in the Upper Peninsula. It involves rotary drilling with the mast of the drilling rig tilted to the desired inclination for the completion of a non-vertical well. Administrative rule R 325.1639(7) of Part 127, Water Supply and Sewer Systems, of the Michigan Public Health Code, 1978 PA 368, as amended, requires that a well be sufficiently straight and vertical to allow normal installation and operation of the pump. However, this regulatory requirement predates angle water well drilling in Michigan.

## **AUTHORITY:**

Part 127, Water Supply and Sewer Systems, of the Public Health Code, 1978 PA 368, as amended, and rules, the Michigan Water Well Construction and Pump Installation Code, Groundwater Quality Control Rules (R 325.1601 et seq.), adopted under authority of Part 127, being MCL 333.12701 et seq. (Code).

## **STAKEHOLDER INVOLVEMENT:**

Local health departments (LHDs) in the Upper Peninsula requested guidance from the DEQ on the processing of permits for the construction of angle-drilled water wells. A water well drilling contractor, who performs angle drilling in the Upper Peninsula, provided input into this policy. The Ground Water Advisory Committee and Department of Attorney General were copied on this policy and procedure.

## **POLICY:**

Submersible pumps can be properly installed and operated in nonvertical well casings if centering guides and rigid pipe are used to eliminate torque abrasion. It is important that submersible pumps in angle-drilled wells be installed within the casing rather than being placed in an uncased bedrock borehole. Complying with minimum grouting requirements in the Code



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requires the installation of casing centralizers to help ensure a uniform grout envelope in angle-drilled wells.

If a well drilling contractor is proposing to use angle drilling, it should be noted on the well permit application. The well drilling contractor or permit applicant should furnish the LHD with a plan showing, at a minimum, the following:

1. The reason for angle drilling rather than conventional vertical drilling.
2. The distance from the proposed wellhead to the closest property line in the direction of the borehole.
3. The proposed direction and angle of the borehole from a vertical plane, in degrees.
4. The estimated length of the completed borehole.
5. The horizontal and vertical distances from the wellhead to the borehole terminus.

To avoid common law trespass issues, the borehole of an angle-drilled well should terminate beneath the same property on which the wellhead is located. If it is proposed that a portion of the borehole be constructed beneath neighboring property, or if hydraulic-fracturing is proposed beneath neighboring property, proof of legal permission through an easement or other similar means, from the adjacent property owner, authorizing the drilling or hydraulic-fracturing beneath their property should be required by the LHD before issuing a permit.

If review of a water well record suggests that an angle-drilled well may terminate near the property line or beneath adjoining property, a triangulation calculation can determine if the borehole lies within the property boundaries. If the calculation shows the borehole lying beneath adjoining property, the well owner should be asked to obtain legal authorization from their neighbor before the local LHD should approve the well. Another alternative is to plug the borehole back to the appropriate elevation to keep the entire borehole within property boundaries. When there is uncertainty over the borehole bottom location, the LHD can request the permittee to submit a downhole directional well survey. The survey points within the well should be at an interval of not more than 50 feet and must include the terminus of the borehole.

If a borehole penetrates the bottom of a lake, a permit must be obtained from the DEQ, Water Resource Division, under Part 325, Great Lakes Submerged Lands, 1994 PA 451, as amended, (Natural Resources and Environmental Protection Act) (NREPA). If a wellbore is beneath, but does not penetrate the lake bottom, a permit under Part 325 is not required. However, a wellbore beneath a Great Lake, tributary, or other navigable waterway requires that a permit application be filed with the U.S. Army Corps of Engineers (USACE), under Section 10 of the Rivers and Harbors Act of 1899. A determination of jurisdiction is made by the USACE on a case-by-case basis.

An angle drilled well that is intended as a potable water supply should not have any uncased/ungROUTED portion lying within 25 feet of the lake bottom. If the well terminates closer than 25 feet below the lake bottom, the well has the potential to furnish groundwater that is under the influence of surface water. The consumption of untreated groundwater under surface



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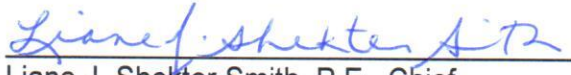
water influence is not advised. However, a health officer may authorize the use of an alternate groundwater source if a conventional well cannot be constructed due to hydrogeological limitations, under R 325.1674, Other Water Sources, Rule 174, of the Michigan Water Well Construction and Pump Installation Code. The plans, specifications, operation, and maintenance procedures for the use of groundwater under the influence of surface water must include facilities for complete treatment that encompasses pretreatment, filtration, continuous disinfection, frequent bacteriological and chemical monitoring, and water treatment unit maintenance contracts with certified water treatment professionals, to help ensure acceptable quality water for a potable water supply system.

**PROCEDURES:**

| WHO                             | DOES WHAT  |
|---------------------------------|--|
| LHDs                            | Require proper documentation on the well permit application proposing angle drilling. Issue the well construction permit and evaluate and inspect the installed water system using the requirements within the policy and procedure as guidance. |
| Water Well Drilling Contractors | Provide proper documentation on the well permit application containing the information. Provide a well record. Install the water system according to part 127 requirements and well permit requirements.   |

*Compliance with Part 127 shall be based on the statute and rules promulgated under Part 127. Nothing in the policy and procedure shall be used in an enforcement action brought against a Registered Water Well Drilling Contractor or Pump Installer. This policy and procedure shall expire on December 31, 2014, unless superseded before that date.*

**OFFICE CHIEF APPROVAL:**

  
Liane J. Shekter Smith, P.E., Chief  
Office of Drinking Water and Municipal Assistance

3/15/2013  
Date

**DEPUTY DIRECTOR APPROVAL:**

  
Jim Sygo, Deputy Director

4/3/2013  
Date